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Exploring the relationship between BNPL and credit cards: substitution, complementarity, and consumer credit dynamics

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Abstract

The rise of buy now, pay later (BNPL) services has disrupted traditional consumer credit markets, raising questions about their relationship with established products such as credit cards. Although both offer short-term financing with similar features – such as interest-free periods and flexible repayment options, their roles in consumer behaviour and financial systems are not yet fully understood. This study addresses this gap by analysing potential correlations and changes in the use of BNPL and credit cards in Poland. The research combines a literature review with empirical analysis based on two data sources: a CAWI survey of 350 BNPL users and transaction-level data from the Credit Information Bureau (BIK) from June 2023 to July 2025. Using Dynamic Time Warping (DTW), the study examines relationships between macroeconomic indicators and transaction values and volumes. Results show no clear similarity in the trends of BNPL and credit card transactions, suggesting they do not evolve in a correlated way. However, salary-related variables, CCI, and CL follow similar patterns over time. Overall, the findings provide a nuanced view of how BNPL and credit cards coexist rather than directly substitute each other in the Polish market.

Keywords: BNPL, credit cards, consumer credit, personal finance, financial behaviour
JEL: E41, E42, G28, D12, H26

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1. Introduction

Since 2010, the FinTech sector has expanded rapidly, driven by advances in digital technologies and the accelerating digitisation of everyday life. This growth intensified in response to recent macroeconomic shocks – notably the COVID-19 pandemic and rising geopolitical risks. The pandemic compelled financial institutions to shift towards remote access channels, further stimulating the adoption of innovative solutions offered by FinTech companies. At the same time, evolving lifestyles and shifting consumer preferences – enabled by digital technologies – have accelerated transformation within the financial sector. Innovation cycles have become significantly shorter, with technological advancements and their associated products and services forming a foundation for maintaining competitiveness in the financial market (OECD 2019). As a result, traditional social preferences (realised through conventional distribution channels) are being replaced by virtual options accessed via remote distribution channels (Ilin 2019).

This shift has contributed to the emergence of a new form of consumer credit on the financial market: deferred payments (BNPL – buy now, pay later). Despite the growing popularity of deferred payments and research dedicated to this instrument (e.g. Waliszewski, Solarz, Kubiczek 2024), as yet no in-depth analyses have been conducted regarding the mutual interactions between this method of financing consumption and traditional forms of consumer credit, such as credit cards (e.g. Abed, Alkadi 2024; Pisany, Gromek 2023). Previous analyses have predominantly focused on BNPL as a standalone financial instrument. These studies are often fragmentary, concentrating mainly on factors driving its development or on regulatory aspects. However, no studies have directly analysed the complementarity or substitutability of credit cards and BNPL. This is probably due to the significant difference in transaction volumes. However, variations in the growth rate of both these markets may suggest that the market structure will undergo significant changes in the future.

The significance of BNPL in the Polish market is reinforced by quantitative trends and projections which point to the expansion of deferred payment services occurring in parallel with a decrease in the volume of credit card loans. Based on data provided by Research & Market,[1] the BNPL sector in Poland has been experiencing rapid growth with projections indicating a market value expansion to USD 2.80 billion by 2030. Following an annual growth rate of 23.7% from 2021 to 2024, the sector's upward trajectory is anticipated to persist with a forecasted CAGR[2] of 10.0% from 2025 to 2030. Global BNPL size was valued at USD 235.36 billion in 2023, and the total BNPL revenue is expected to grow at a CAGR of 36.17% from 2024 to 2030, reaching nearly USD 2046.08 billion.[3]

This is justified because credit cards are also still continuously evolving in terms of form and services. Consumers may use credit cards unrestrictedly in their traditional physical form, as well as in a digital version (virtual payment card wallets such as Apple Pay). Credit card issuers enable consumers to repay debt via fresh, innovative schemes, blurring the functional differences between them and BNPL payments, for example. Therefore, what would appear worthy of deeper analysis is whether the launch of new forms of consumer credit will spur the cannibalisation of existing financial products,

[1] https://www.globenewswire.com/news-release/2025/02/24/3031255/28124/en/Poland-s-Buy-Now-Pay-Later-Busi9ness-Report-2025-Market-Projected-to-Reach-2-8-Billion-by-2030-75-KPIs-on-Size-End-Use-Sectors-Market-Share-Product-Analysis-Business-Model-Demograp.html?utm_source=chatgpt.com, accessed May 2025.

[2] The compound annual growth rate (CAGR) is the annual rate of return that shows how an investment grows from its beginning value to its ending value over time, assuming reinvested profits.

[3] https://www.maximizemarketresearch.com/market-report/global-buy-now-pay-later-market/118477/, accessed May 2025.

or if the volume of consumer debt will increase. The problem defined above and the aforementioned lack of academic research thereof constitute a research gap that this article aims to fill by determining the extent to which BNPL competes with credit cards, and by outlining the factors that underpin customer choice between forms of payment.

The aim of this article is to empirically assess the relationship between the use of BNPL deferred payment services and traditional forms of consumer credit in Poland, with particular emphasis on potential patterns of substitution or complementarity. The article aims to examine the extent to which BNPL functions as an alternative to credit cards and whether the dynamics of their use are related to selected macroeconomic variables in terms of changes in consumer behaviour.

Main hypothesis:

BNPL services in Poland currently complement traditional credit products rather than being a direct substitute for them.

Specific hypotheses:

1. Consumers using BNPL services simultaneously maintain liabilities under traditional credit products, which implies the complementary nature of both categories of financial instruments.

2. There are no statistically significant dynamic correlations between the time series of transactions carried out using BNPL services and the time series of transactions made with credit cards, which indicates a lack of empirical evidence for the substitutability of these forms of financing.

3. Although long-term observation may reveal a potential evolution in the relationship between BNPL services and traditional credit products, a complementary relationship configuration dominates in the analysed time horizon.

Empirical confirmation of the complementarity or substitutability of BNPL and credit cards could have invaluable practical significance from the perspective of financial product and service providers, such as banks and FinTechs. The manner in which market changes occur – evolution vs. substitution – influences trading strategies and credit risk assessment models. From the perspective of households, the growing popularity of BNPL as a complementary product means an increase in the number of available financial products and increases financial inclusion. The conclusions drawn in this article are based on a critical analysis of the literature, and the results of a statistical analysis of selected factors underlying the number and value of transactions conducted either in the form of deferred payments or by using credit cards.

2. Literature review

In accordance with the legal regulations in force in Poland regarding the provision of consumer credit agreements, a large number of entities may offer this type of product. These include entities regulated by the Banking Law (domestic banks, foreign banks, branches of foreign banks, credit institutions, or branches of credit institutions),[4] cooperative savings and credit unions, and the National Cooperative Savings and Credit Union, a national payment institution, a small payment institution, a national electronic money institution, an EU payment institution, or an EU electronic money institution[5] to the extent that it grants payment credit, as well as an entity whose activity consists in granting consumer

[4] Ustawa z dnia 29 sierpnia 1997 r. – Prawo bankowe, Dz. U. [Journal of Laws] 2024, item 1646, as amended.

[5] Ustawa z dnia 19 sierpnia 2011 r. o usługach płatniczych, Dz. U. [Journal of Laws] 2025, items 611 i 1069.

credit in the form of deferral of payment of the price or remuneration for the purchase of goods and services offered by it. Such a large number of entities offering credit products has a significant impact not only on the size of the market, but also on the number of types of credit products. A consumer credit agreement is understood to mean an agreement for a loan of no more than PLN 255,550 or the equivalent of this amount in a currency other than the Polish currency, which the lender grants or promises to grant to the consumer within the scope of its business.[6] In particular, this includes a loan agreement, a credit agreement within the meaning of banking law, an agreement to defer the date of payment by the consumer if the consumer is obliged to bear any costs related to the deferral of payment, and a revolving credit agreement.

In recent years, because of, among other things, the macroeconomic shock caused by the COVID-19 pandemic, the emergence of new players – especially from the LendTech sector – and changing consumer preferences toward digital customers, BNPL payments have become an increasingly popular form of consumer credit. Spending mostly fulfilled from distance during the COVID-19 pandemic increased the volume of BNPL transactions over the past 5 years (Aslan, Valiyev, Kanberoğlu 2025). Based on a review of the literature on the subject, deferred payments are increasingly being compared to other credit products (Kusmalinda 2025). Due to the rapid development of deferred payments, supervisory bodies have faced the challenge of how to regulate this sector (Lehmann 2020), especially since FinTech market regulations tend to concern payments (Khiaonarong, Goh 2020). BNPL – a type of generally interest-free consumer loan payable in instalments – was first introduced in Europe, Australia, and North America (Guttman-Kenney, Firth, Gathergood 2023). Consequently, consumers tend to prefer this payment option. Businesses also favour it – not only as a tool to increase sales turnover, but in some cases because they generate higher revenues from commissions on BNPL transactions (Aslan, Valiyev, Kanberoğlu 2025).

The development of deferred payment systems has created a regulatory gap (Tijssen, Garner 2021), posing significant risks for participants in the financial market (Lux, Epps 2022). In the United States, it did not take long before the differences between BNPL and credit cards observably blurred, with the two products starting to merge. Therefore, in May 2024, the Consumer Financial Protection Bureau (CFPB) decided that BNPL lenders should be classified as credit card providers (CFPB 2024). This trend has been undoubtedly influenced by the rapid growth of the BNPL sector in the United States, where it now accounts for approximately 10% of the unsecured consumer credit market (Pattamatta, Dabadaghao 2022). In the EU, the relevant authorities have also been working on a directive that might regulate this sector of the payments market.[7] In Poland, deferred payments have been reported to the Credit Information Bureau since May 2023, when new regulations obliged lenders to inform and update the institution specified in Article 105 paragraph 4 of the Banking Law regarding loans granted. Therefore, a reliable analysis of the number and value of deferred payments in Poland has been possible since June 2023.

However, there are numerous studies in the literature on the subject that point to significant differences between BNPL and credit cards. BNPL credit has three distinguishing features compared with standard credit cards (Caporal 2022):

– BNPL products are structured as instalment loans with a down payment due at sale and a fixed repayment schedule – they are not revolving loans;

6 Ustawa z dnia 12 maja 2011 r. o kredycie konsumenckim, Dz. U. [Journal of Laws] 2025, item 1362.
7 Directive (EU) 2023/2225 of the European Parliament and of the Council.

– BNPL loans are offered directly through retailers and are linked to the purchase of a particular product;

– BNPL providers frequently apply more lenient lending criteria, with no or limited credit checks, often zero interest, minimal fees, and no or limited negative reporting to credit watchdogs.

In addition, credit cards can supplement deferred payments in many situations. One of the current trends is to repay deferred payments with a credit card. This is indicated by research conducted, among others, on the British market. There are documented cases of credit cards being charged with BNPL transactions. Charging credit cards with BNPL transactions is very popular among younger consumers and people living in the poorest regions (Guttman-Kenney, Firth, Gathergood 2023). According to the research, this raises another regulatory research question: should consumers be able to refinance their unsecured debt? Nevertheless, this is another research gap in the analysis of the use of various credit products, in this case credit cards and deferred payments.

The limited availability of statistical data significantly impacts the scope of research on deferred payments. Much recent academic work on consumer finance, and in particular willingness to use FinTech and BNPL financial products, documents marginal propensities to consume from transitory income, which cannot be fully explained by parameterised standard market models without considering liquidity constraints. For example, Baker and Yannelis (2017), Ganong and Noel (2019) as well as Olafsson and Pagel (2018) show that consumers have a tendency not to consume smoothly in response to expected positive or negative income shocks. Havranek and Sokolova (2020), provide a meta-analysis of over 100 studies conducted between 1982 and 2017 and argue that liquidity constraints explain the results better than alternatives such as 'rule of thumb' consumption. Only a minimal number of papers address the response of consumption to potential easing of liquidity constraints due to increased credit availability. Gross and Souleles (2002), and Aydin (2022), use observational and experimental changes in credit limits on existing credit cards to identify propensity to consume.

Studies comparing two credit products, namely credit cards and deferred payments, are the subject of increasingly extensive analyses conducted by, inter alia, Cornelli, Gambacorta, and Pancotto. Numerous similarities between these products have been outlined (Cornelli, Gambacorta, Pancotto 2023). The potential for further growth in the BNPL market is considerable, as illustrated in Figure 1.

Figure 1 shows that the growth rate of BNPL loans is significantly higher and more volatile than that of credit card loans. After an initial decline in the second half of 2023, the BNPL segment accelerates strongly in 2024 and again in 2025, reaching levels well above the June 2023 baseline. Credit card growth, on the other hand, is moderate and relatively stable, with periodic declines at the turn of 2023 and 2024, and at the end of 2024. Overall, the Figure 1 shows that BNPL is growing faster and more dynamically than credit cards, which are growing more slowly and without a clear accelerating trend.

Therefore, Table 1 presents the fundamental differences between these two credit products.

Credit cards have been a product known in the market for many years. BNPL is an innovation that spreads rapidly in the market and is communicated through specific channels over time among participants in the social system. Rogers and Williams (1983) considered five main elements influencing the diffusion of a new idea: the innovation itself, the people implementing it, the communication channels, time, and the social system. All these elements are present in the case of BNPL.

Another distinguishing feature between the two loan products may be customer segmentation based on age. BNPL users tend to be younger than traditional credit card holders, which is partly attributable to their lower financial status and limited inclusion in the formal banking sector.

According to data from the Federal Reserve Bank of New York, 20.3% of individuals under 40 use BNPL services, compared to 15.6% of those aged 40–59.

An analysis by LexisNexis Risk Solutions found that BNPL users in the United States are predominantly under the age of 35, with over 94% classified as repeat customers (Cooley 2024).

Statista data show that 60% of BNPL app users are aged 18–34, underscoring the strong appeal of this service among younger consumers (Sharma 2026).

In contrast, traditional credit card ownership skews toward older demographics:

– WalletHub reports that individuals aged 60 and over are 40% more likely to own a credit card than those aged 18–29;

– a 2022 Experian report reveals that members of Generation X and Baby Boomers hold an average of more than four credit cards per person, whereas Generation Z typically owns only two (DiFurio 2022).

DiFurio's (2022) analysis examines the relationship between consumer age, wealth, credit rating, and number of credit cards owned vs. frequency of BNPL use. This study shows that older Americans with better credit scores are more likely to use credit cards than BNPL. The author believes that this state of affairs stems from the significant barrier to entry caused by the need for a positive credit assessment when obtaining a credit card. In contrast, there is no such requirement for BNPL and no such obstacle, which therefore nudges young people towards this form of deferred payment.

The impact of credit card ownership on the decision to make a BNPL purchase has been studied by Ackert, Khayati, and Kelani (2025). They report a positive relationship between having current account debt and the likelihood of choosing BNPL, but a negative relationship between owning a credit card and opting for BNPL. Those without a credit card declare that they are more likely to make BNPL purchases. One of the conclusions is that consumers with no experience of using a credit card may be tempted by the apparent simplicity and ease of obtaining BNPL financing. On the other hand, those with larger credit card balances are more likely to make a purchase using a BNPL loan (Ackert, Khayati, Kelani 2025).

In turn, research by Aslan, Valiyev, and Kanberoğlu (2025) indicates that deferred payments increase consumer spending by offering consumers more flexible forms of financing than credit cards. Furthermore, BNPL creates greater opportunities than credit cards for financial inclusion by increasing the availability of consumer credit and consumer spending in less developed regions (Aslan, Valiyev, Kanberoğlu 2025). Bian, Cong, and Ji (2023) indicate that BNPL is displacing other payment options in e-wallets. Aalders (2023) argues that BNPL companies are more versatile and flexible than credit card institutions, and also provide loans with higher ethical standards. Stavins (2024) also mentions the advantage of BNPL over credit cards as it can provide short-term credit to consumers who lack alternative sources of credit, first and foremost, for those who may not have credit cards, or have low available credit limits.

Credit cards continue to be regarded as a 'premium' financial product, requiring a comprehensive credit assessment, in contrast to the simplified checks typically associated with BNPL services. However, it is worth emphasising that the structure of customers using credit cards and deferred payments is not significantly diversified. Of course, BNPL remains a relatively new offering in the financial market and is still in its growth phase, which may partly explain its lower recognition and adoption among older consumers. Nevertheless, as Figure 2 indicates, the structure of customers aged 35–44 using both credit cards and deferred payments is similar and exceeds 25% of all customers.

Guttman-Kenney, Firth, and Gathergood's study (2023) indicates that these two credit products are linked, proving that British consumers very often repay deferred payments by credit card. In the UK, a consumer cannot make a mortgage repayment by credit card or repay one credit card with another. These regulations are designed to protect vulnerable consumers but do not apply to BNPL loans (Guttman-Kenney et al. 2022). The interconnectedness of these products is also highlighted by Di Maggio, Williams, and Katz (2022), who suggest that in 2021, around one-fifth of credit card users also made deferred payments, and that BNPL amounted to around 2% of total credit card spending. Their research indicates that many consumers use both credit products. However, half of consumers say that they spend somewhere between 10% and over 40% more when using deferred payments compared to paying by credit card.

By 2017, some authors had already mentioned a decrease in the number of consumer loans via credit cards, while the number of consumer loans granted using deferred payments had increased (Romānova, Kudinska 2017). A similar trend is currently noticeable in Poland. This suggests that BNPL is an increasingly popular method of financing consumption. This may indicate that in the long term, deferred payments may be a key form of financing among the various types of consumer loans available in Poland.

Research conducted among younger European consumers highlighted two other significant phenomena associated with BNPL and credit card users. Gębski et al.'s (2025) study revealed that many BNPL users harbour misconceptions about the characteristics of BNPL – young users who do not have a credit card often perceive it as something other than a credit product. Among those who used credit cards, BNPL was perceived correctly. They treated BNPL as a complement to the available financial offer.

3. Methodology

3.1. Statistical analysis and Dynamic Time Warping method

The primary objective was to identify the factors associated with the number and value of transactions conducted using deferred payment instruments, specifically BNPL services and credit cards. To address this aim, monthly data obtained from BIK were employed. The study covers 26 consecutive monthly periods, corresponding to the available data starting from June 2023, when regulatory requirements mandating the reporting of deferred payment obligations by financial institutions came into effect.

In addition to transaction-level data, several macroeconomic and banking sector indicators were incorporated to examine their potential associations with both the frequency and monetary volume of BNPL and credit card transactions. The complete set of variables, including operational definitions and data sources, is presented in Table 2.

To examine the interdependence of the analysed variables, we employed a time-series specific similarity measure based on Dynamic Time Warping (DTW). Traditional correlation measures, while practical for static analysis, fail to account for the chronology of observations, temporal shifts and nonlinear distortions in the data. The DTW method enables flexible alignment of sequences with varying lengths and dynamics, allowing for a more accurate detection of structural similarities and hidden synchronization patterns across time. DTW is increasingly used in macroeconomics to compare

and cluster time series data that exhibit temporal misalignment, such as GDP growth, inflation, or financial stability indicators across countries or regions (Bernardelli, Próchniak 2023a, 2023b; Franses, Wiemann 2020).

DTW provides a quantitative measure of similarity between two time series by allowing flexible, nonlinear alignment. The DTW distance is a scalar value representing the similarity or dissimilarity of two time series. The lower the value, the more similar the time series are, indicating a higher degree of structural similarity, even if the timing of peaks and troughs differs. The alignment path produced by DTW reveals how one series must be warped to match the other, offering insights into lead-lag relationships or delayed policy effects.

The interdependence of the considered time series can be shifted in time; hence, the comparative analysis takes into account optimal shifts, where the DTW distance measures optimality. Due to the different amplitudes and scales of the values, before making comparisons, the time series were normalized to the interval [0, 1]. Determining the degree of similarity using DTW enables an objective comparative assessment between pairs of time series and makes it possible to rank the variables from more to less interdependent.

4. Results

For each pair of series, we considered shifts of up to two months in either direction and retained the shift that yielded the minimum DTW distance. The interpretation of the shift notation used is as follows:

– negative values mean that the time series mentioned in the row lags the time series in the column by the specified amount,

– positive shift values mean that the time series mentioned in the column lags the time series in the row by the specified amount.

Green colour in the table indicates greater similarity, red less similarity. In Table 3, lower DTW distances (highlighted in green) indicate pairs of time series with more similar temporal patterns, while higher values (in red) point to weaker similarity.

The analysis results indicate that increased BNPL use precedes expected wage changes (people use BNPL before wage increases). Credit card payments respond after approximately two periods (after income increases).

It is worth noting that the number and value of credit card transactions (numCC and vCC) display greater similarity in their temporal patterns (DTW = 3.71) than the corresponding BNPL measures (numBNPL and vBNPL; DTW = 4.72). Figures 3 and 4 plot the value of BNPL transactions against the value of credit card transactions (DTW = 3.56) and against the number of credit card transactions (DTW = 3.62), respectively.

On both Figures 3 and 4, the unshifted BNPL series (vBNPL, blue line) and the credit card series (numCC or vCC, green dotted line) follow somewhat different paths, which is in line with the DTW results. After shifting the credit card series by two months (solid green line), the curves look more alike: several local increases and decreases appear at similar points in time or with a short delay. This may

indicate that changes in credit card use and BNPL spending are loosely related over time, although the evidence remains tentative given the short observation period.

To further illustrate the degree of similarity between the analysed time series, Diagram 1 presents a dendrogram showing their grouping into the most closely related clusters. The group of variables related to credit card transactions and BNPL transactions turns out to be quite similar. The remaining variables (CCI, Salary and CL_cum) also form a fairly close group. These factors are jointly linked to households' borrowing capacity and propensity to incur debt, which may explain why their trajectories over time are closely aligned. Periods of improving consumer confidence and rising income typically coincide with greater willingness and ability to take on credit obligations, while downturns tend to be reflected simultaneously in lower credit limits, weaker confidence and stagnating or declining income dynamics.

5. Discussion

The statistical analysis, survey results, and the lack of clear similarity in the time paths of BNPL and credit card use together suggest that, at the current stage of market development, these financial products tend to function more as complements than as substitutes. However, this interpretation should be regarded as preliminary due to the relatively short observation period and the novelty of BNPL products.

The findings partially align with those of other authors. For instance, Ackert, Khayati, and Kelani (2025) and Guttman-Kenney et al. (2023) found that BNPL users often simultaneously hold credit cards and that BNPL is frequently repaid using credit card funds. This supports the hypothesis of functional overlap or complementarity. Similarly, Di Maggio, Williams, and Katz (2022) observed increased consumer spending when BNPL was used alongside credit cards, suggesting additive effects rather than substitution.

On the other hand, some studies – such as Bian, Cong, and Ji (2023) and Aslan, Valiyev, and Kanberoğlu (2025) – highlight substitution tendencies, especially among younger users or those excluded from traditional banking. These divergent international findings suggest that BNPL's role may be context-dependent, shaped by regulatory environments, credit accessibility, and user demographics.

BNPL increases financial accessibility and reduces credit exclusion, particularly for consumers who do not qualify for traditional forms of financing (Waliszewski, Solarz, Kubiczek 2024). By offering a convenient and flexible payment option, BNPL promotes greater financial inclusion. The product's risk is not only the often-weaker financial standing of BNPL consumers, but also their lower financial literacy. This influences a greater share of spontaneous purchasing decisions. Credit card holders pass through the complexities of bank credit risk assessment systems and often demonstrate a higher level of financial literacy (Gębski, Daw 2024). This partially explains the differences in time-series analysis of BNPL and credit card spending.

In summary, while the present study identifies a complementary relationship between BNPL and credit cards in Poland, it acknowledges the need for longer-term, cross-country research to determine whether this coexistence is transitional or structurally persistent.

6. Conclusions

Efforts to assess the relationship, or lack thereof, between deferred payments and credit card liabilities are hindered by the short period for which reliable data on the number and value of BNPL liabilities are available. The literature presents arguments for both the complementarity and substitutability of the analysed credit products. This is undoubtedly related to the given financial market, the selection of the research sample (in this case, the age of the respondents is a key factor), as well as regulations regarding financing options.

Based on the time-series evidence, BNPL does not appear to act as a direct substitute for traditional credit products in the sense of refinancing existing liabilities, but rather tends to function as a complementary, short-term payment tool for informed consumers. Moreover, a significant proportion of consumers using deferred payments also have other credit liabilities, which suggests that BNPL complements traditional consumer loans (including instalment loans, cash loans, overdrafts, or credit card liabilities). Taken together, the available data indicate that, in Poland, deferred payments currently operate as an alternative credit option rather than a full substitute for traditional credit products such as credit cards. Nevertheless, these conclusions remain tentative given the short time span of the data.

The analysis of temporal trajectories using DTW indicates that there is no clear similarity between BNPL transactions and credit card transactions, either in terms of transaction counts or transaction values. This implies that, from a dynamic perspective, we do not yet observe strong substitution patterns between these forms of financing. It is possible that no stronger relationship is detected due to the novelty effect characteristic of the early adoption stage of innovative financial products. According to Rogers' innovation diffusion model, new solutions are initially used mainly by innovators and early adopters, and only later does the product reach a broader consumer base. Only once BNPL has achieved wider diffusion and has become more embedded in consumers' financial behaviour will it be possible to assess its relationship with credit card lending in a more robust way. While the current findings point more towards complementarity than substitution, longer-term monitoring is required to determine whether this pattern is transitional or persistent.

This study raises significant practical implications. The conclusions are significant for lenders in terms of designing their services. They may help answer the question of whether this new product increases the total volume of loans, and therefore income, or whether it primarily replaces traditional forms of financing. The latter conclusion does not necessarily mean that consumer lending services should not be developed, because a new product may turn out to be cheaper and safer. Moreover, not offering such a product may erode the portfolio as consumers opt for such products offered by the competition.

Data analysis, combined with research findings from other researchers, indicates a substitutability phenomenon between BNPL and credit cards among young consumers and those with lower incomes. A key factor in this regard is credit risk analysis, which places credit cards significantly higher than BNPL. Young consumers and those in more vulnerable financial situations are not always able to apply for a credit card, but BNPL providers' creditworthiness assessment systems accept their risk and enable them to use the financial product.

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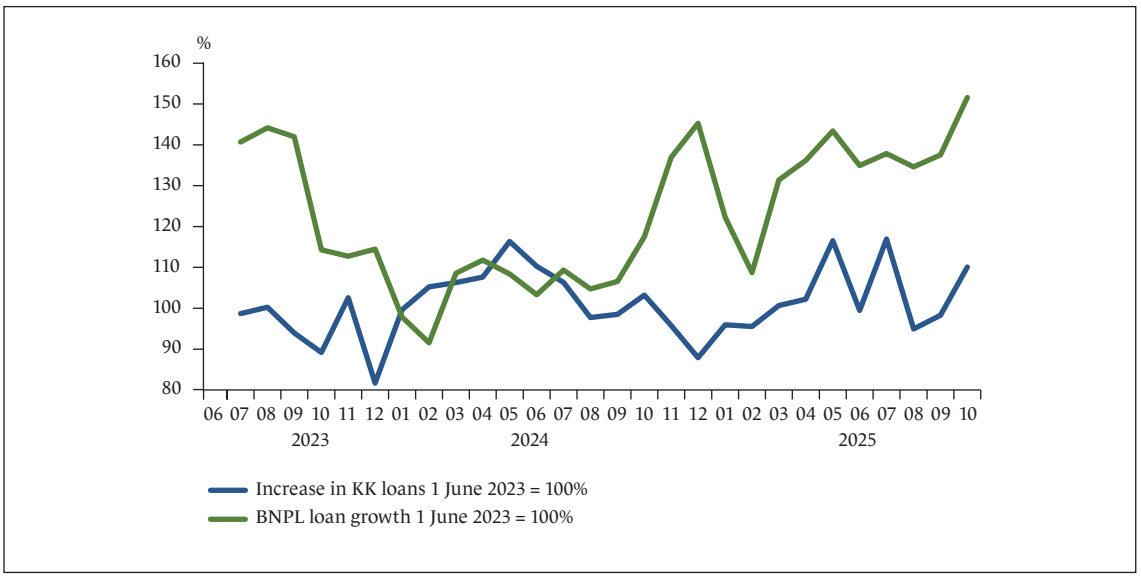
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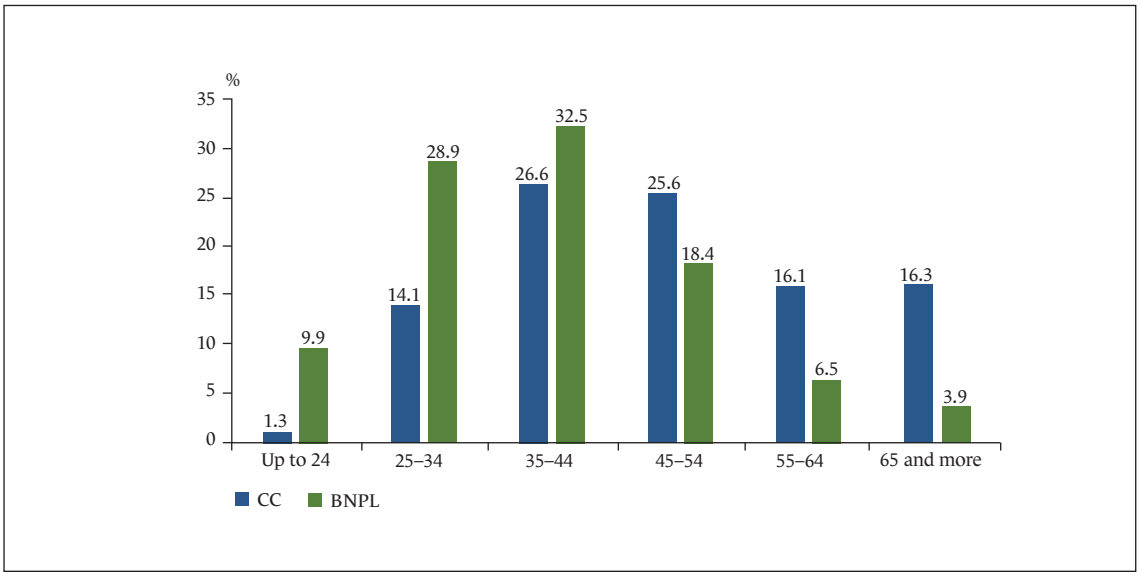
Appendix

Figure 1
Increase in the number of consumer loans using credit cards and deferred payments in Poland in the period June 2023 – October 2025



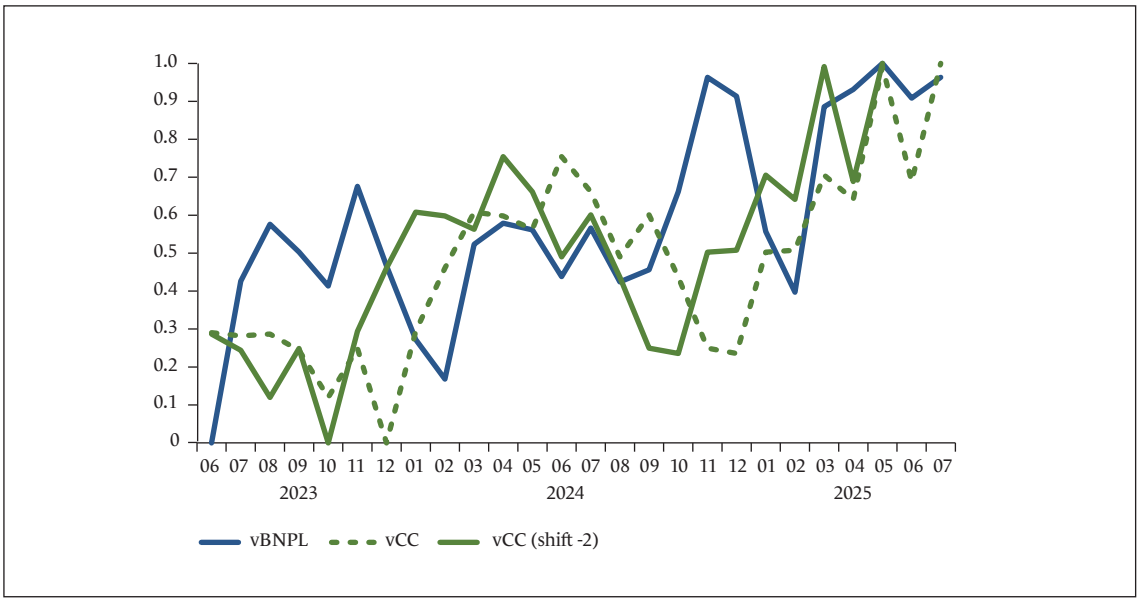
Source: own study based on data from BIK (the Credit Information Bureau).

Figure 2
Age structure of credit card and BNPL customers



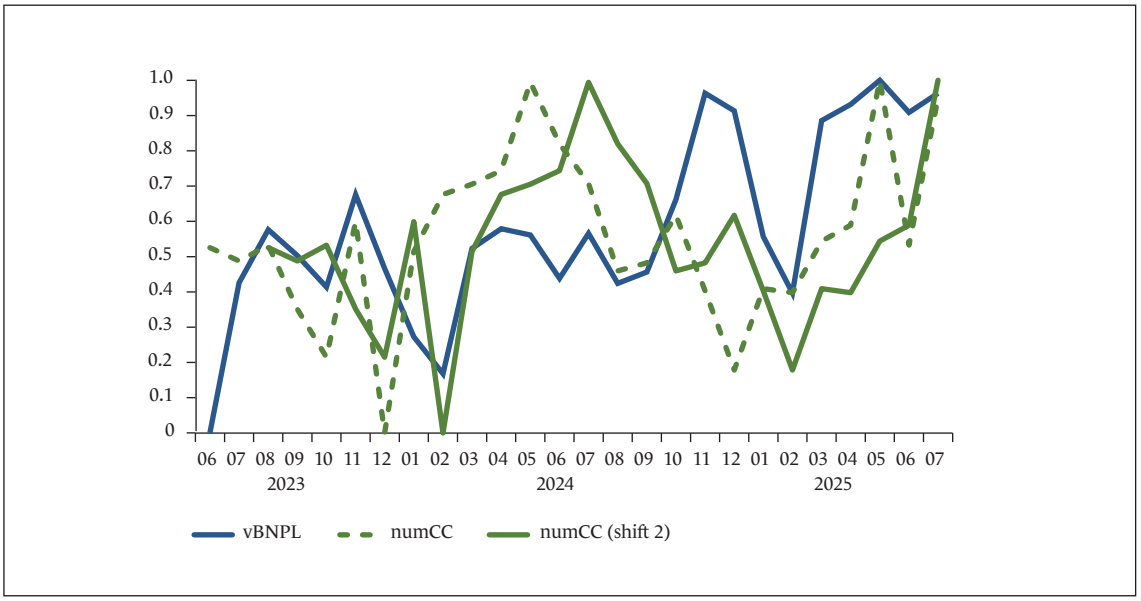
Source: own study based on data from BIK (the Credit Information Bureau).

Figure 3
Value of BNPL transactions against the value of credit card transactions



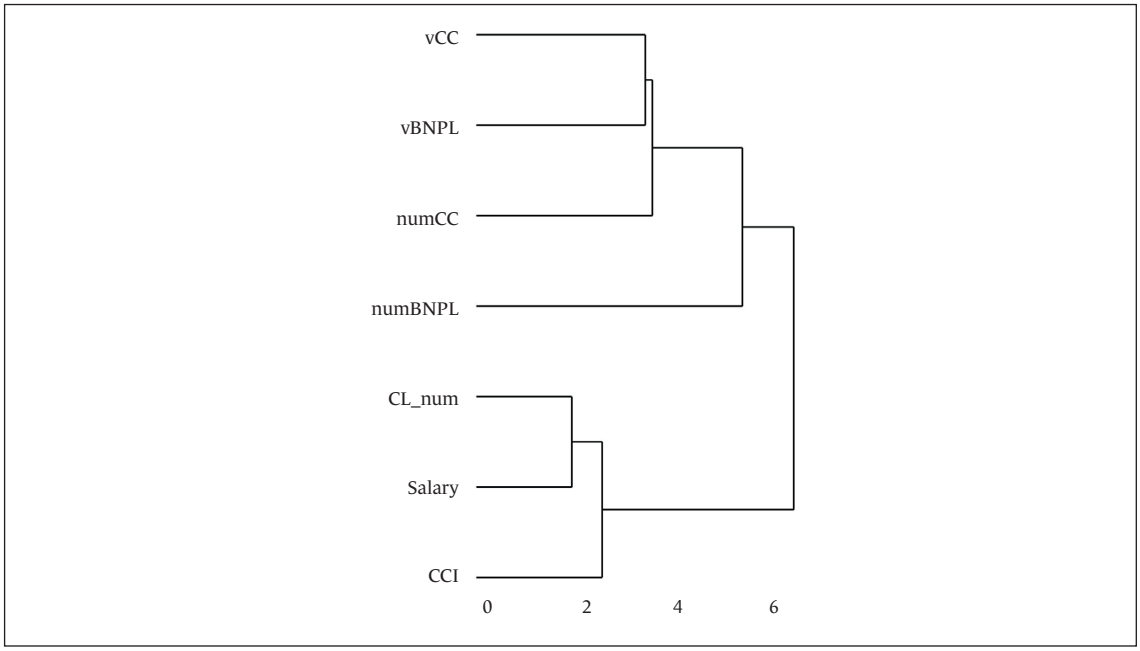
Source: own study.

Figure 4
Value of BNPL transactions against the number of credit card transactions



Source: own study.

Diagram 1
Dendrogram with clustering based on the DTW measure



Source: own study.

Table 1
Comparison of credit cards and BNPL in Poland – selected criteria

Criterium	Credit card	BNPL
Should it be reported to the Credit Information Bureau?	YES	YES
Supervised by the Polish Financial Supervision Authority?	YES	YES
Impact on creditworthiness?	YES	YES
Time taken to analyse creditworthiness	Relatively long	Relatively short
Linking to a bank account	YES	NO
Level of commitment	Relatively high	Relatively low
Transparency of the terms and conditions	Relatively complex	Relatively easy
Product availability	Relatively narrow	Relatively wide

Source: own study.

Table 2
Variable definitions and data sources

Abb	Name	Data source
numBNPL	Number of BNPL transactions	Credit Information Bureau
vBNPL	Value of BNPL transactions	Credit Information Bureau
numCC	Number of credit card transactions	Credit Information Bureau
vCC	Value of credit card transactions	Credit Information Bureau
CCI	Consumer confidence index	Statistics Poland
Salary	Average monthly gross salary	Statistics Poland
CL_cum	Cumulative value of consumer loans	Polish Financial Supervision Authority

Source: own study.

Table 3
DTW distances with optimal shifts

	numBNPL	vBNPL	numCC	vCC	CCI	Salary	CL_cum
numBNPL		-2	-2	2	-1	-2	-2
vBNPL	4.72		2	-2	-2	-2	-2
numCC	5.61	3.62		2	-2	2	2
vCC	5.11	3.56	3.71		-1	2	-2
CCI	5.69	4.70	4.35	3.41		0	-1
Salary	5.26	3.37	5.58	3.22	2.40		2
CL_cum	5.39	4.47	6.69	4.02	2.65	2.01	

Source: own study.

Badanie relacji między płatnościami odroczonymi (BNPL) a kartami kredytowymi: substytucja, komplementarność i dynamika kredytu konsumenckiego

Streszczenie

Dynamiczny rozwój sektora FinTech, przyspieszony przez pandemię COVID-19 oraz postępującą cyfryzację usług finansowych, doprowadził do pojawienia się i szybkiej ekspansji płatności odroczonych typu *buy now, pay later* (BNPL). W dotychczasowych badaniach koncentrowano się głównie na BNPL jako odrębnym instrumencie finansowym, analizując czynniki jego wdrażania, wpływ na zachowania konsumentów, inkluzję finansową oraz wyzwania regulacyjne. Jednocześnie literatura dotycząca kart kredytowych jest rozbudowana, jednak rzadko uwzględnia relacje między kredytem konsumenckim a nowymi formami kredytu cyfrowego.

Brakuje pogłębionych analiz empirycznych, które wprost badałyby relację między BNPL a kartami kredytowymi w kategoriach substytucyjności lub komplementarności, zwłaszcza na polskim rynku. Artykuł wypełnia tę lukę badawczą, dostarczając pierwszą, opartą na danych transakcyjnych z Biura Informacji Kredytowej (BIK), analizę dynamiki obu instrumentów oraz ich powiązań z wybranymi zmiennymi makroekonomicznymi. Nowością pracy jest zastosowanie metody Dynamic Time Warping (DTW) do porównania ścieżek czasowych BNPL i kart kredytowych.

Główne pytanie badawcze dotyczy tego, czy płatności odroczone BNPL w Polsce pełnią rolę substytutu kart kredytowych czy raczej funkcjonują jako instrument komplementarny, współistniejący z tradycyjnymi formami kredytu konsumenckiego. Autorzy analizują również, czy dynamika wykorzystania obu produktów jest powiązana z czynnikami makroekonomicznymi, takimi jak dochody, nastroje konsumenckie oraz łączna wartość kredytów konsumenckich.

Główna hipoteza artykułu zakłada, że usługi BNPL w Polsce obecnie są uzupełnieniem tradycyjnych produktów kredytowych i nie stanowią ich bezpośredniego substytutu. Hipotezy szczegółowe wskazują, że:

– użytkownicy BNPL często jednocześnie mają zobowiązania z tytułu kart kredytowych,

– nie występują istotne statystycznie dynamiczne korelacje pomiędzy szeregami czasowymi transakcji BNPL i kart kredytowych,

– relacja między tymi instrumentami może ewoluować w długim okresie, jednak w analizowanym horyzoncie dominuje komplementarność.

Powodem sformułowania hipotez jest obserwowany równoległy wzrost rynku BNPL i stagnacja lub spowolnienie rynku kart kredytowych, co rodzi pytania o przyszłą strukturę rynku kredytu konsumenckiego. Badanie opiera się na dwóch źródłach danych:

– badaniu ankietowym CAWI przeprowadzonym wśród 350 aktywnych użytkowników BNPL w Polsce,

– miesięcznych danych transakcyjnych BIK obejmujących okres od czerwca 2023 r. do lipca 2025 r.

Kluczową metodą analityczną jest DTW, umożliwiająca porównywanie szeregów czasowych o różnej dynamice i potencjalnych opóźnieniach. Metoda ta jest szczególnie przydatna w analizie zjawisk finansowych, w przypadku których reakcje zmiennych mogą być przesunięte w czasie. Uzupełniająco zastosowano analizę klastrową oraz interpretację wyników w świetle literatury przedmiotu.

Wyniki analizy DTW nie wykazały wyraźnego podobieństwa trajektorii czasowych liczby i wartości transakcji BNPL oraz kart kredytowych, co sugeruje brak silnych podstaw empirycznych, by stwierdzić ich substytucyjność. Jednocześnie zaobserwowano zbliżone ścieżki czasowe zmiennych makroekonomicznych (dochody, wskaźnik ufności konsumenckiej, skumulowana wartość kredytów konsumenckich), co wskazuje na ich wspólny wpływ na skłonność gospodarstw domowych do zadłużania się.

Analiza przesunięć czasowych sugeruje, że wzrost wykorzystania BNPL często jest poprzedzony wzrostem dochodów, podczas gdy reakcja w zakresie kart kredytowych pojawia się z opóźnieniem. Wyniki te wspierają tezę o odmiennych funkcjach obu instrumentów w cyklu konsumpcyjnym.

Autorzy wnioskują, że BNPL w Polsce pełni obecnie funkcję komplementarną wobec kart kredytowych, zwiększając elastyczność finansowania konsumpcji i dostęp do krótkoterminowego kredytu, zwłaszcza dla młodszych i mniej zamożnych konsumentów. Wyniki mają istotne implikacje praktyczne dla banków, firm FinTech oraz regulatorów, m.in. w zakresie projektowania produktów, oceny ryzyka kanibalizacji oraz monitorowania zadłużenia gospodarstw domowych.

Podstawowym ograniczeniem badania jest krótki horyzont czasowy danych dotyczących BNPL. Wynika to stąd, że dopiero niedawno wprowadzono obowiązek raportowania tych zobowiązań do BIK (od 18 maja 2023 r.). Ponadto analiza koncentruje się na rynku polskim, co ogranicza możliwość bezpośrednich uogólnień międzynarodowych. Autorzy podkreślają również, że relacja między BNPL a kartami kredytowymi może się zmieniać wraz z dojrzewaniem rynku i dalszym rozwojem regulacji.

Słowa kluczowe: płatności odroczone (BNPL), karty kredytowe, kredyt konsumencki, finanse osobiste, zachowania finansowe